Andrew Schechtman-Rook
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SKILLS

Programming: C++, Python (including Matplotlib, Numpy, Scikit-learn, Scipy), shell scripting.
Databases and Web Design: Django, HTML, MySQL, PHP.
Operating Systems: Linux, Mac OS X.
Data Analysis: Bootstrapping; genetic algorithms; image processing and machine vision; interpolation; linear and non-linear regression; Monte Carlo; numerical integration and differentiation; parallel and distributed computing; principal component analysis; rootfinding.
Oral Presentations: Described advanced analysis and modeling to both expert and non-expert audiences through engaging lectures and informal discussions.
Writing: Published research in leading scientific journals (full list available upon request).

PROFESSIONAL EXPERIENCE

Postdoctoral Research Associate 2014-Present
University of Wisconsin-Madison

- Improved agreement between numerical models and astronomical data by up to 20% using new metrics implemented in highly optimized Python.
- Built a fast Voronoi Tessellation algorithm to adaptively bin images, preserving spatial resolution while maximizing signal in images with over one million pixels.

Research Assistant 2007-2013
University of Wisconsin-Madison

- Developed a non-linear Levenberg-Marquardt χ^2 fitting algorithm using a combination of Python and C++ to constrain models of spiral galaxies to data.
- Employed on-campus distributed computing resources to perform large-scale modeling in parallel, using over 20 years of computer time in 1 month.
- Assembled a hybrid C++/Python processing pipeline to process hundreds of high-resolution images with minimal user intervention, resulting in a 10x increase in analysis precision.
- Created a genetic algorithm in C++ to efficiently fit galaxy models with unusually large numbers of free parameters to high-resolution images.
- Utilized frequency-domain analysis to understand the spatial distribution of galactic structure.
- Computed descriptive statistics about 200+ astronomical objects from raw survey data automatically via custom-built analysis software blending C++ and shell scripting programs.
- Classified a previously unknown galaxy using data from seven different sources.

Research Assistant 2006-2007
Case Western Reserve University

- Designed and executed statistical analyses of simulated galaxy clusters to optimize strategy for future data acquisition.
- Used regression analysis to compute a conversion between astronomical filter systems.

OTHER RELEVANT EXPERIENCE

Independent NFL Analyst 2013-Present
phdfootball.blogspot.com

- Mined a play-by-play database containing over 500,000 records across dozens of tables for complex relationships between individual players as well as teams.
- Explained findings to a broad audience through both written posts and evocative figures.

EDUCATION

Ph.D., Astronomy, University of Wisconsin-Madison December 2013
MS, Astronomy, University of Wisconsin-Madison June 2009
BS, Astronomy, Case Western Reserve University May 2007